

## CLAIMS:

1. Illumination system, comprising a radiation source and a fluorescent material comprising at least one phosphor capable of absorbing a part of light emitted by the radiation source and emitting light of wavelength different from that of the absorbed light; wherein said at least one phosphor is a cerium-activated carbido-  
5 nitridosilicate of general formula  $(RE_{1-z})_{2-a}EA_aSi_4N_{6+a}C_{1-a}:Ce_z$  wherein  $0 \leq a < 1$ ,  $0 < z \leq 0.2$ , EA is at least one earth alkaline metal selected from the group of calcium, strontium and barium, and RE is a least one rare earth metal chosen from the group of yttrium, gadolinium and lutetium.
- 10 2. Illumination system according to claim 1, wherein the radiation source is a light emitting diode.
3. Illumination system according to claim 1, wherein the radiation source is selected from the light emitting diodes having an emission with a peak emission  
15 wavelength in the range of 400 to 480 nm and wherein the fluorescent material comprising a cerium-activated carbido-nitridosilicate of general formula  $(RE_{1-z})_{2-a}EA_aSi_4N_{6+a}C_{1-a}:Ce_z$  wherein  $0 \leq a < 1$ ,  $0 < z \leq 0.2$ , EA is at least one earth alkaline metal selected from the group of calcium, strontium and barium, and RE is a least one rare earth metal chosen from the group of yttrium, gadolinium and lutetium.
- 20 4. Illumination system according to claim 1, wherein the radiation source is selected from the light emitting diodes having an emission with a peak emission wavelength in the range of 400 to 480 nm and the fluorescent material comprises a cerium-activated carbido-nitridosilicate of general formula  $(RE_{1-z})_{2-a}EA_aSi_4N_{6+a}C_{1-a}:Ce_z$  wherein  $0 \leq a < 1$ ,  $0 < z \leq 0.2$ , EA is at least one earth alkaline metal selected from  
25 the group of calcium, strontium and barium, and RE is a least one rare earth metal

chosen from the group of yttrium, gadolinium and lutetium and a second phosphor.

5. Illumination system according to claim 4, wherein the second phosphor is a red phosphor selected from the group  $(\text{Ca}_{1-x}\text{Sr}_x)\text{S}:\text{Eu}$ , wherein  $0 \leq x \leq 1$  and  $(\text{Sr}_{1-x-y}\text{Ba}_x\text{Ca}_y)_{2-z}\text{Si}_{5-a}\text{Al}_a\text{N}_{8-a}\text{O}_a:\text{Eu}_z$  wherein  $0 \leq a < 5$ ,  $0 < x \leq 1$ ,  $0 \leq y \leq 1$  and  $0 < z \leq 0.2$ .

6. Illumination system according to claim 4, wherein the second phosphor is a green phosphor selected from the group comprising  $(\text{Ba}_{1-x}\text{Sr}_x)_2\text{SiO}_4:\text{Eu}$ , wherein  $0 \leq x \leq 1$ ,  $\text{SrGa}_2\text{S}_4:\text{Eu}$  and  $\text{SrSi}_2\text{N}_2\text{O}_2:\text{Eu}$ .

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7. Illumination system according to claim 1, wherein the radiation source is selected from the light emitting diodes having an emission with a peak emission wavelength in the UV range of 200 to 420 nm and wherein the fluorescent material comprises a cerium-activated carbido-nitridosilicate of general formula  $(\text{RE}_{1-z})_{2-a}\text{EA}_a\text{Si}_4\text{N}_{6+a}\text{C}_{1-a}:\text{Ce}_z$  wherein  $0 \leq a < 1$ ,  $0 < z \leq 0.2$ , and EA is at least one earth alkaline metal selected from the group of calcium, strontium and barium, and RE is a least one rare earth metal chosen from the group of yttrium, gadolinium and lutetium.

8. Illumination system according to claim 1, wherein the radiation source is selected from the light emitting diodes having an emission with a peak emission wavelength in the UV-range of 200 to 420 nm and wherein the fluorescent material comprises a cerium-activated carbido-nitridosilicate of general formula  $(\text{RE}_{1-z})_{2-a}\text{EA}_a\text{Si}_4\text{N}_{6+a}\text{C}_{1-a}:\text{Ce}_z$  wherein  $0 \leq a < 1$ ,  $0 < z \leq 0.2$ , and EA is at least one earth alkaline metal selected from the group of calcium, strontium and barium, and RE is a least one rare earth metal chosen from the group of yttrium, gadolinium and lutetium and a second phosphor.

9. Illumination system according to claim 8, wherein the second phosphor is a blue phosphor selected from the group of  $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}$ ,  $\text{Ba}_5\text{SiO}_4(\text{Cl},\text{Br})_6:\text{Eu}$ ,  $\text{CaLn}_2\text{S}_4:\text{Ce}$  and  $(\text{Sr},\text{Ba},\text{Ca})_5(\text{PO}_4)_3\text{Cl}:\text{Eu}$ .

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10. Illumination system according to claim 8, wherein the second phosphor is a red phosphor selected from the group  $\text{Ca}_{1-x}\text{Sr}_x\text{S:Eu}$ , wherein  $0 \leq x \leq 1$  and  $(\text{Sr}_{1-x-y}\text{Ba}_x\text{Ca}_y)_2\text{Si}_{5-a}\text{Al}_a\text{N}_{8-a}\text{O}_a\text{:Eu}_z$  wherein  $0 \leq a < 5$ ,  $0 < x \leq 1$ ,  $0 \leq y \leq 1$  and  $0 < z \leq 0.2$ .
- 5 11. Illumination system according to claim 8, wherein the second phosphor is a green phosphor selected from the group comprising  $(\text{Ba}_{1-x}\text{Sr}_x)_2\text{SiO}_4\text{:Eu}$ , wherein  $0 \leq x \leq 1$ ,  $\text{SrGa}_2\text{S}_4\text{:Eu}$  and  $\text{SrSi}_2\text{N}_2\text{O}_2\text{:Eu}$ .
12. Phosphor capable of absorbing a part of light emitted by the radiation  
10 source and emitting light of wavelength different from that of the absorbed light; wherein said phosphor is a cerium-activated carbido-nitridosilicate of general formula  $(\text{RE}_{1-z})_2\text{EA}_a\text{Si}_4\text{N}_{6+a}\text{C}_{1-a}\text{:Ce}_z$  wherein  $0 \leq a < 1$ ,  $0 < z \leq 0.2$ , EA is at least an earth alkaline metal chosen from calcium, strontium and barium and RE is a least one rare earth metal chosen from the group of yttrium, gadolinium and lutetium.
- 15 13. Phosphor according to claim 12, wherein said phosphor additionally comprises a co-activator selected from the group of praseodymium and samarium.
14. Phosphor according to claim 12, wherein said phosphor is a cerium-  
20 activated carbido-nitridosilicate of general formula  $\text{Y}_2\text{Si}_4\text{N}_6\text{C:5\%Ce}$ .
15. Phosphor according to claim 12, wherein the phosphor has a coating selected from the group of fluorides and orthophosphates of the elements aluminum, scandium, yttrium, lanthanum gadolinium and lutetium, the oxides of aluminum,  
25 yttrium and lanthanum and the nitride of aluminum.